CHAPTER 2

DESCRIPTION OF THE POWELL RIVER WATERSHED

2.1. BACKGROUND. The Powell River originates in southwest Virginia and flows into East Tennessee. For much of its length it flows roughly parallel to theClinch River, into which it flows within the impoundment of the Norris Dam reservoir. It is named for a man called Powell who apparently carved his name into many of the trees of the area while accompanying the exploration party of Dr. Thomas Walker in the mid-eighteenth century. His name appeared so frequently on trees in the valley of this river that later explorers and early pioneers came to call the stream "Powell's River" and the valley "Powell's Valley".

This Chapter describes the location and characteristics of the Powell River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Powell River Watershed is located in East Tennessee and includes parts of Anderson, Campbell, Claiborne, Hancock, and Union Counties.

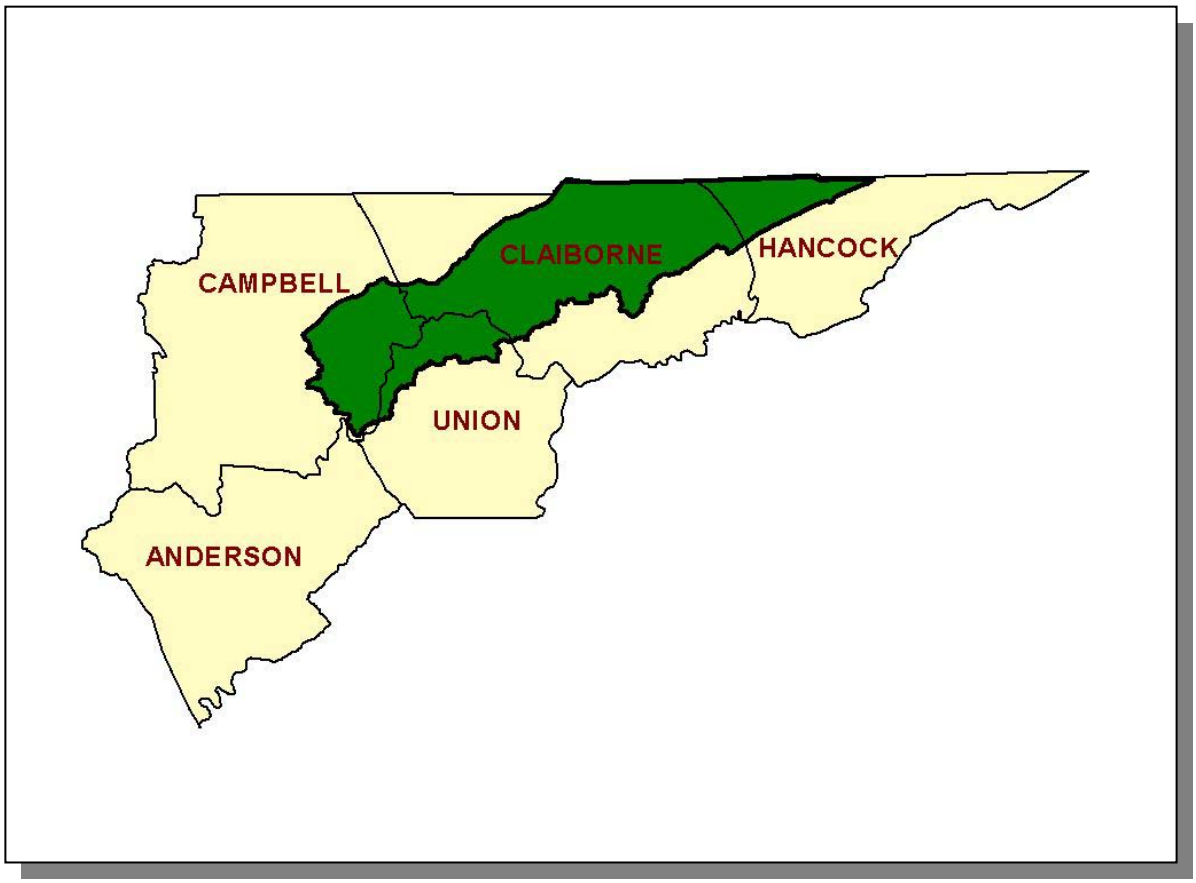

Figure 2-1. General Location of the Tennessee Portion of the Powell River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Claiborne	59.2
Campbell	20.6
Hancock	10.4
Union	9.8

Table 2-1. The Powell River Watershed Includes Parts of Four East Tennessee Counties.

2.2.B. Population Density Centers. Five highways serve the major communities in the Tennessee portion of the Powell River Watershed.

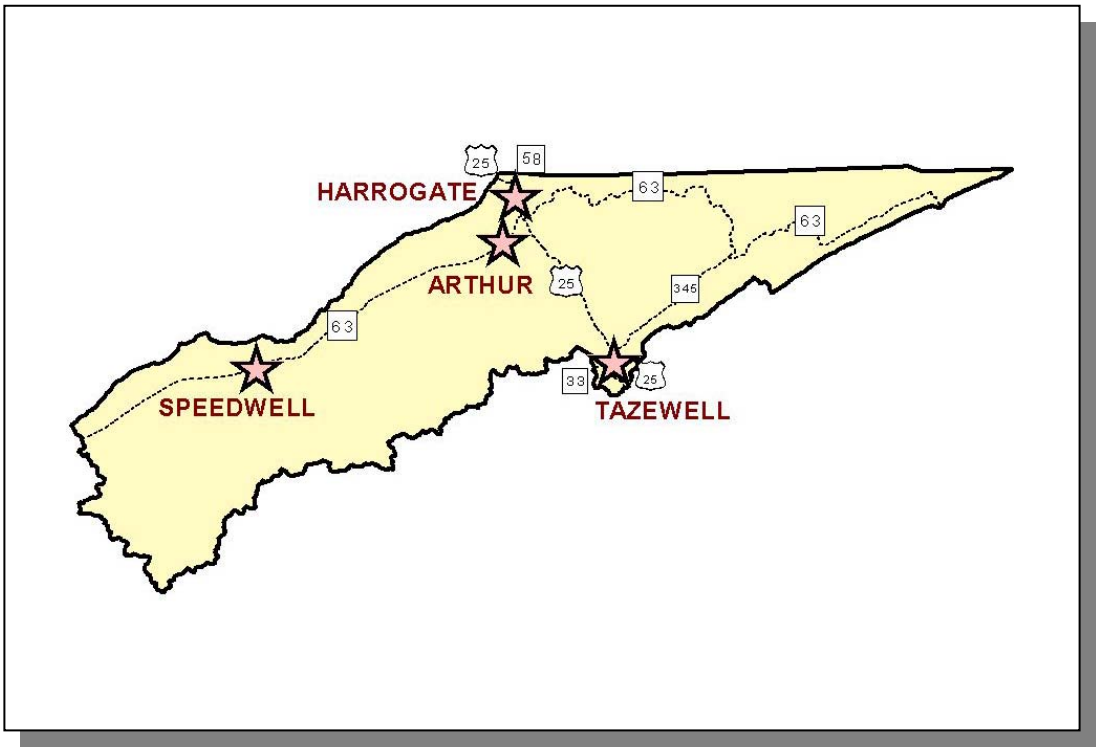

Figure 2-2. Communities and Roads in the Tennessee Portion of the Powell River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Harrogate	4,425	Claiborne
Tazewell*	2,165	Tazewell

Table 2-2. Municipalities in the Tennessee Portion of the Powell River Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com. Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Powell River Watershed, designated 06010206 by the USGS, is approximately 954 square miles (402 square miles in Tennessee) and drains to the Clinch River.

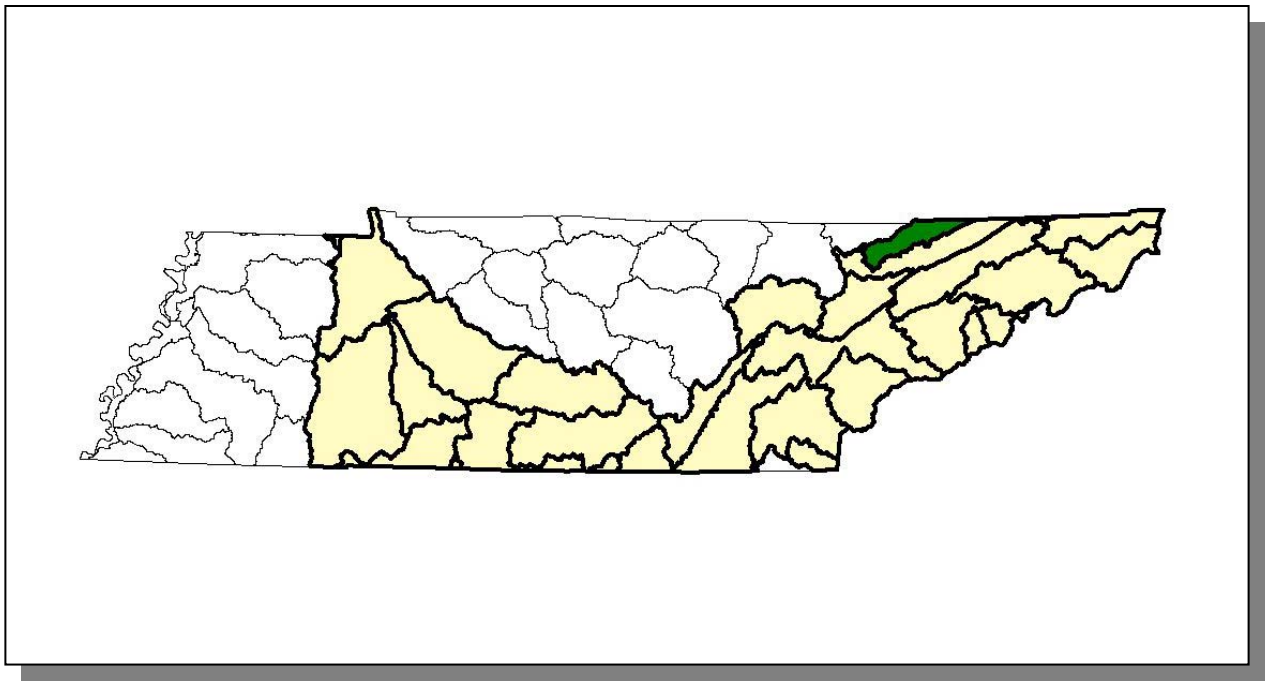

Figure 2-3. The Powell River Watershed is Part of the Tennessee River Basin.

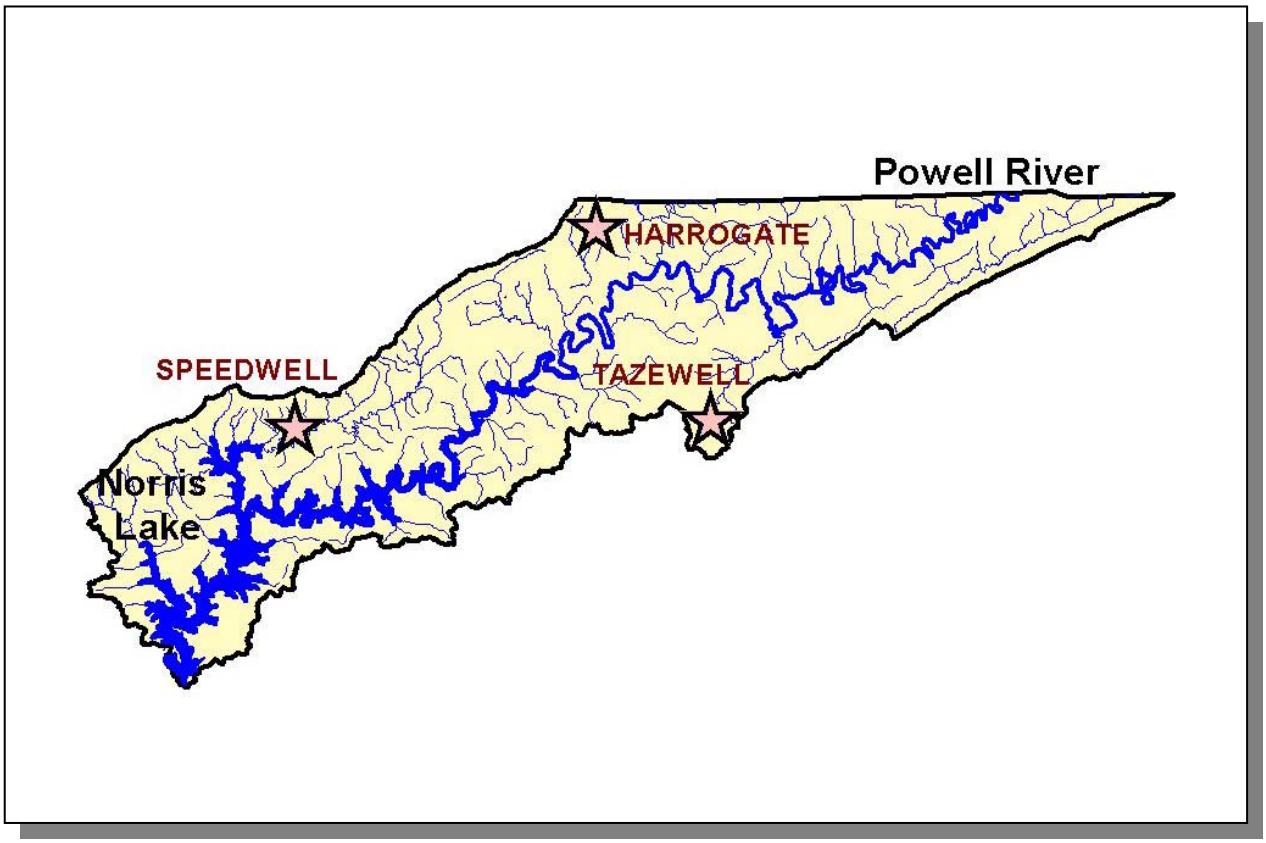

Figure 2-4. Hydrology in the Tennessee Portion of the Powell River Watershed. *There are 429.0 stream miles recorded in River Reach File 3 in the Tennessee portion of the Powell River Watershed. Location of the Powell River including Norris Lake, and the cities of Harrogate, Speedwell, and Tazewell are shown for reference.*

2.3.B. Dams. There are 2 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Powell River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

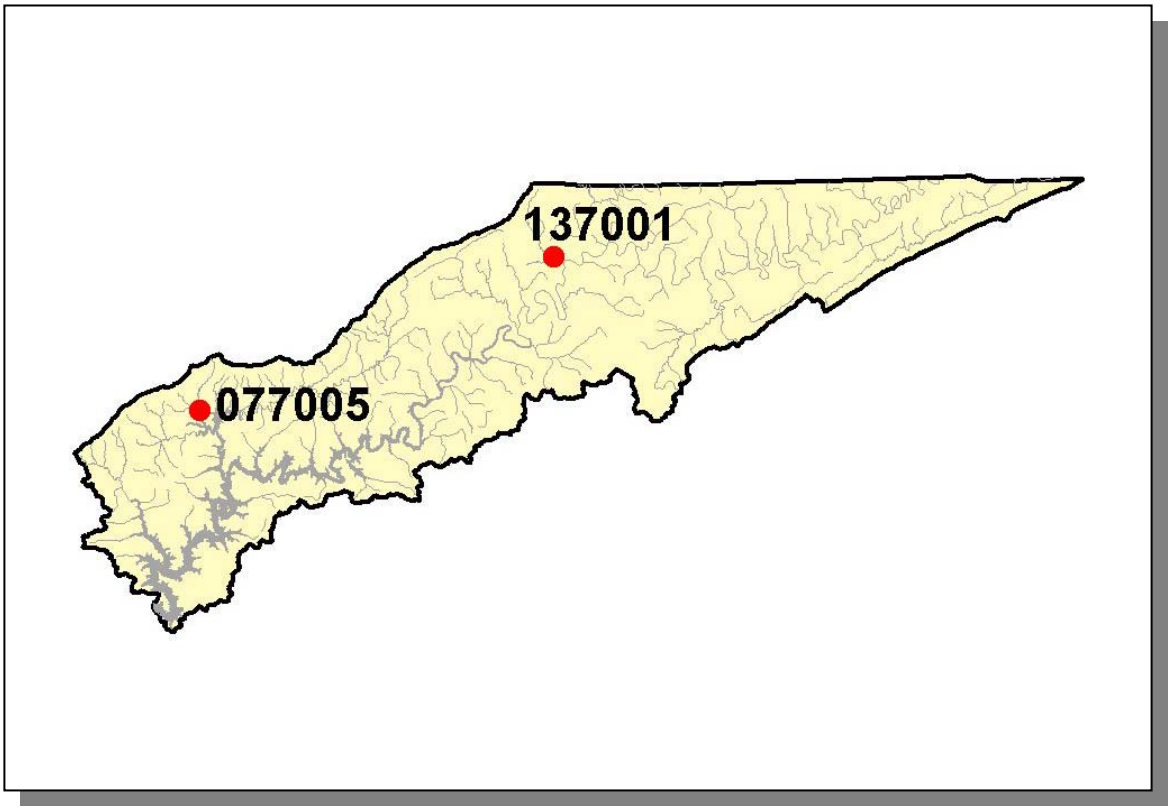

Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Powell River Watershed. *More information is provided in Appendix II and at http://gwidc.memphis.edu/website/dws/.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

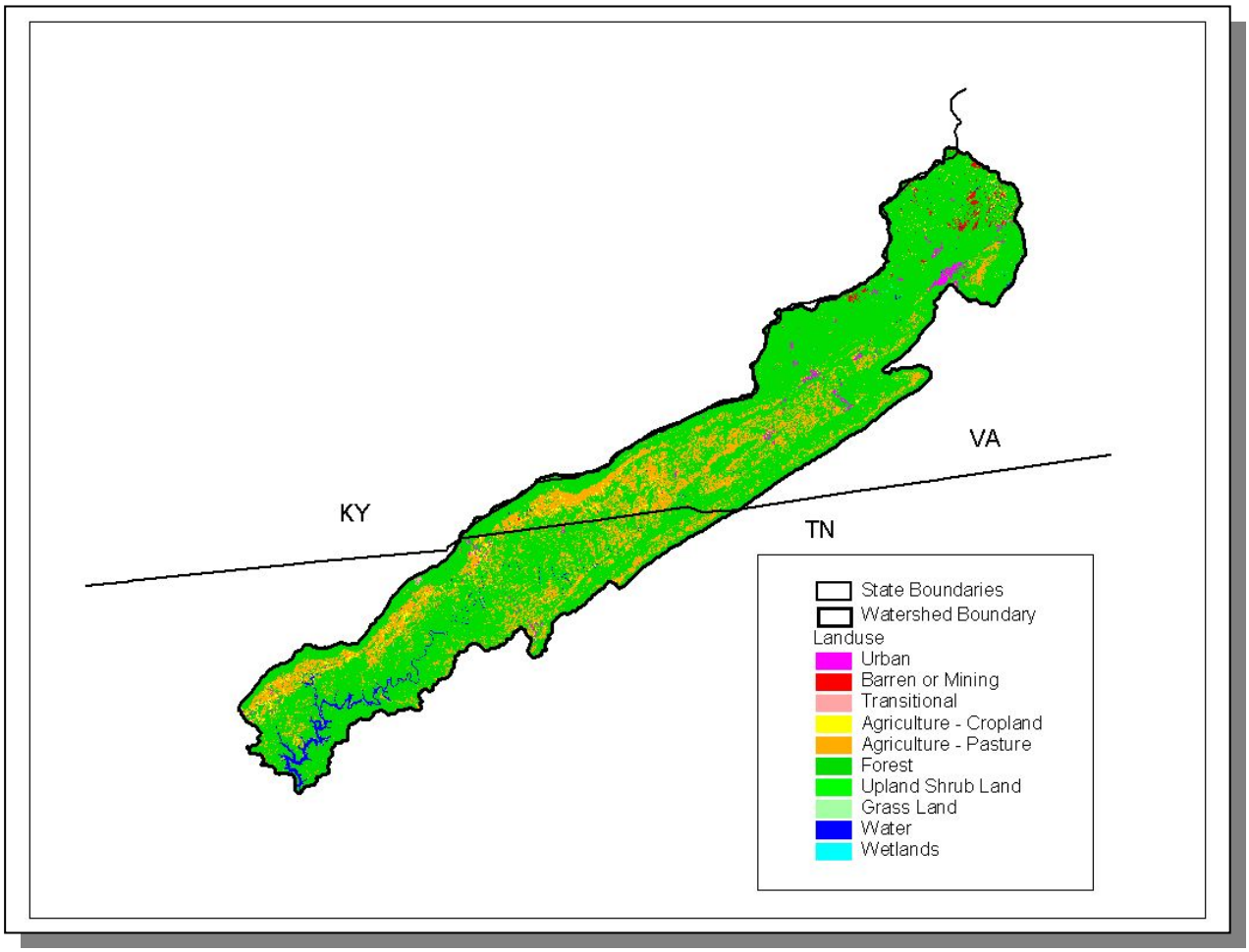

Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

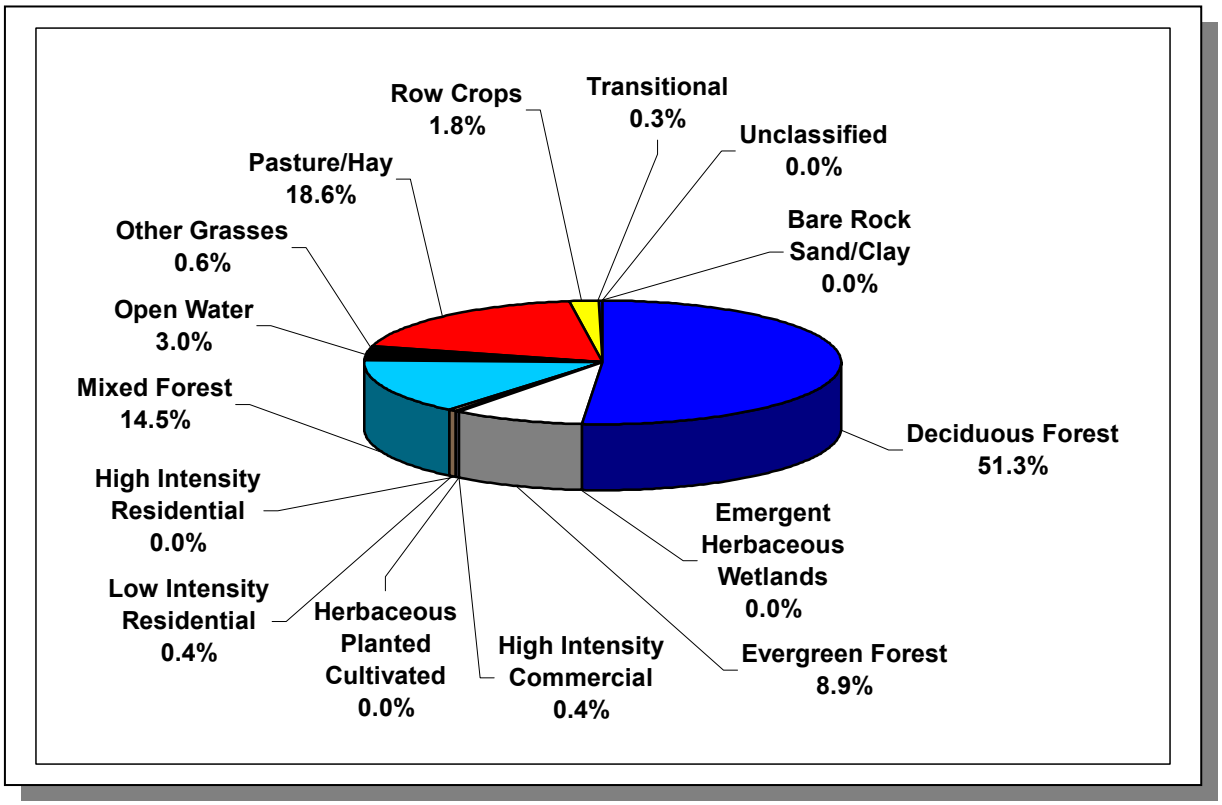

Figure 2-7. Land Use Distribution in the Tennessee Portion of the Powell River Watershed.
More information is provided in Appendix II.

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term "karst" describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term "karst" is named after a famous region in the former country of Yugoslavia.

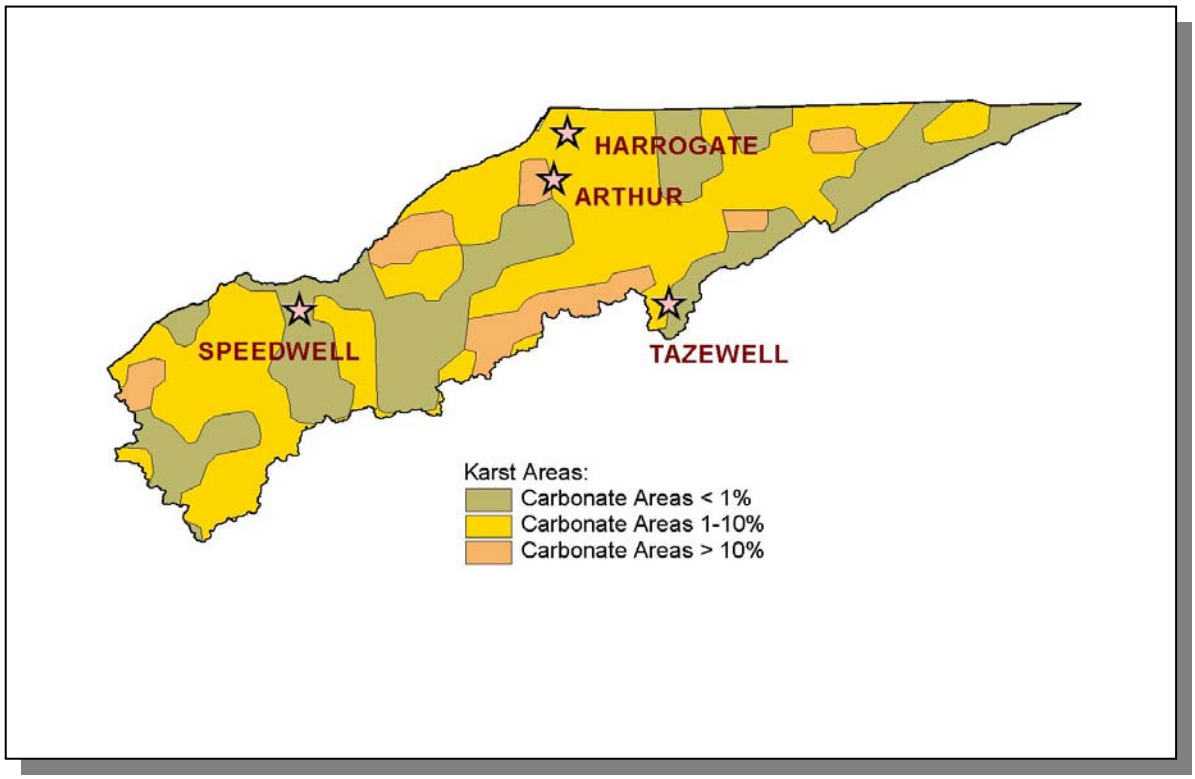

Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the Powell River Watershed. *Locations of communities in the watershed are shown for reference.*

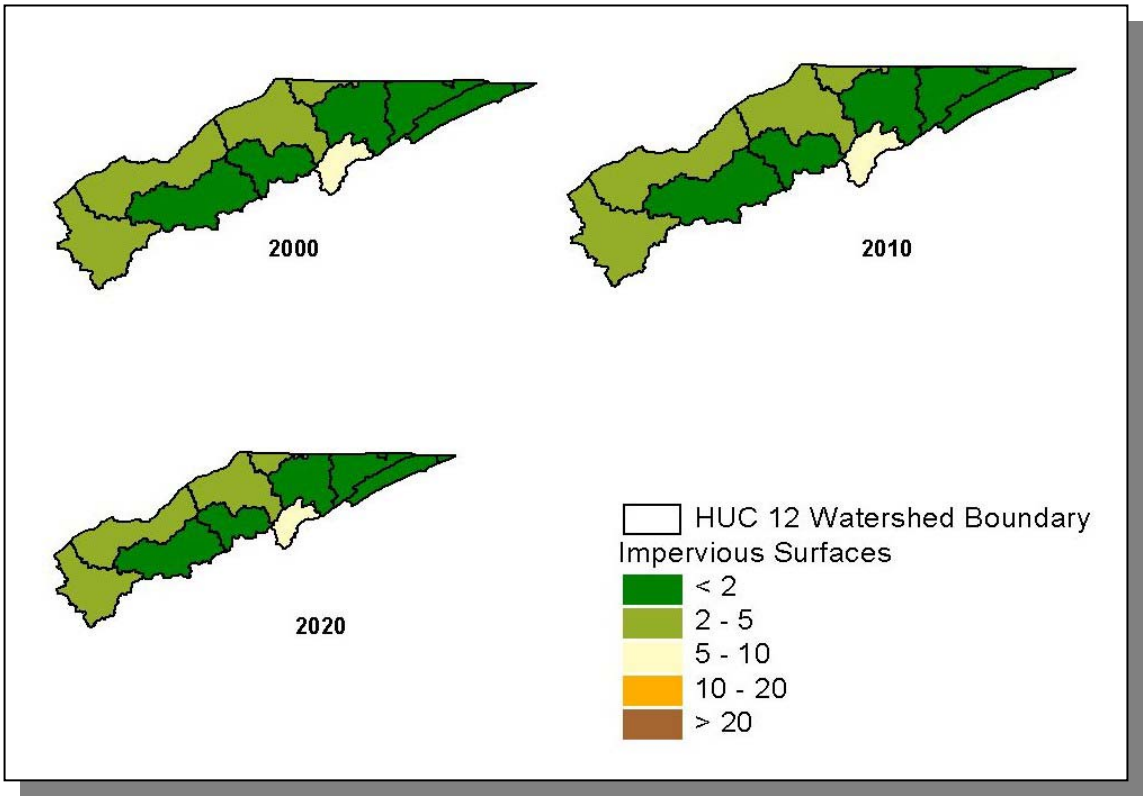

Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Powell River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Tennessee portion of the Powell River Watershed lies within 2 Level III ecoregions (Ridge and Valley and Central Appalachians) and contains 3 Level IV subecoregions:

- The **Southern Limestone / Dolomite Valleys and Low Rolling Hills (67f)** form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the solids vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forests, and sycamore-ash-elm riparian forests are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.

- The **Southern Sandstone Ridges (67h)** ecoregion encompasses the major sandstone ridges, but these ridges also have areas of shale and siltstone. The steep, forested ridges have narrow crests, and the soils are typically stony, sandy, and of low fertility. The chemistry of streams flowing down the ridges can vary greatly depending on the geologic material. The higher elevation ridges are in the north, including Wallen Ridge, Powell Mountain, Clinch Mountain, and Bays Mountain. White Oak Mountain in the south has some sandstone on the west side, but abundant shale and limestone as well. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the Ridge and Valley of Tennessee.

- The **Cumberland Mountains (69d)**, in contrast to the sandstone-dominated Cumberland Plateau (68a) to the west and southwest, are more highly dissected, with narrow-crested steep slopes, and younger Pennsylvanian-age shales, sandstones, siltstones, and coal. Narrow, winding valleys separate the mountain ridges, and relief is often 2000 feet. Cross Mountain, west of Lake City, reaches 3534 feet in elevation. Soils are generally well-drained, loamy, and acidic, with low fertility. The natural vegetation is a mixed mesophytic forest, although composition and abundance vary greatly depending on aspect, slope position, and degree of shading from adjacent land masses. Large tracts of land are owned by lumber and coal companies, and there are many areas of stripmining.

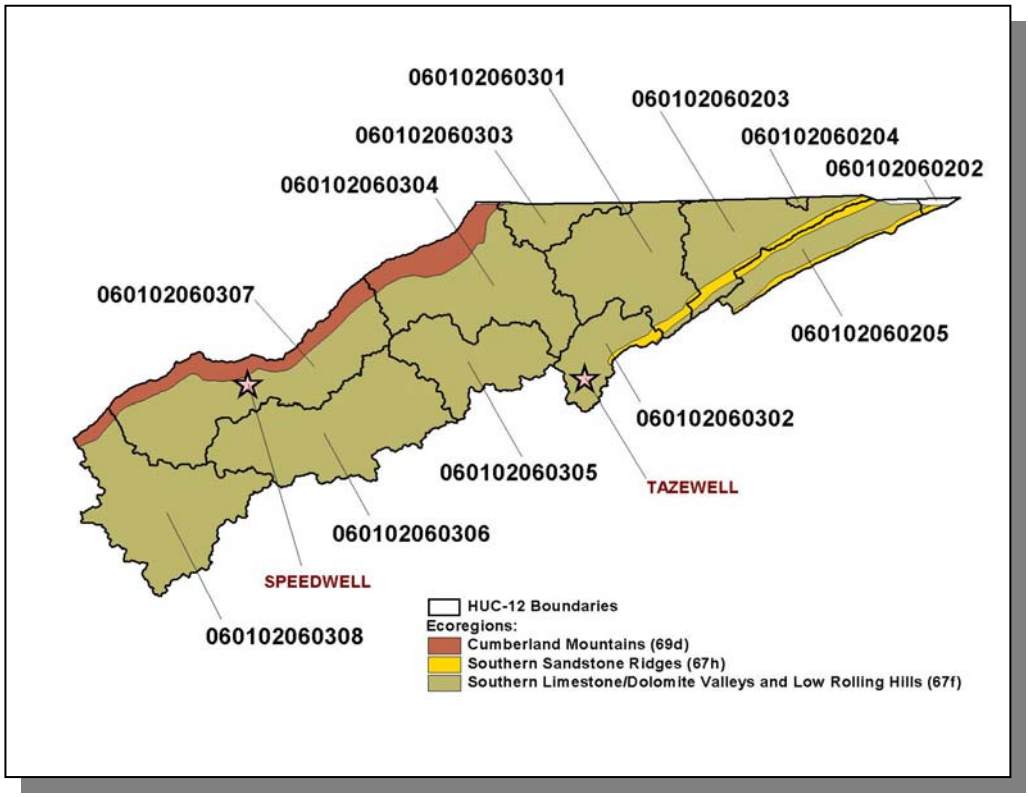

Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Powell River Watershed. *Locations of Speedwell and Tazewell are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

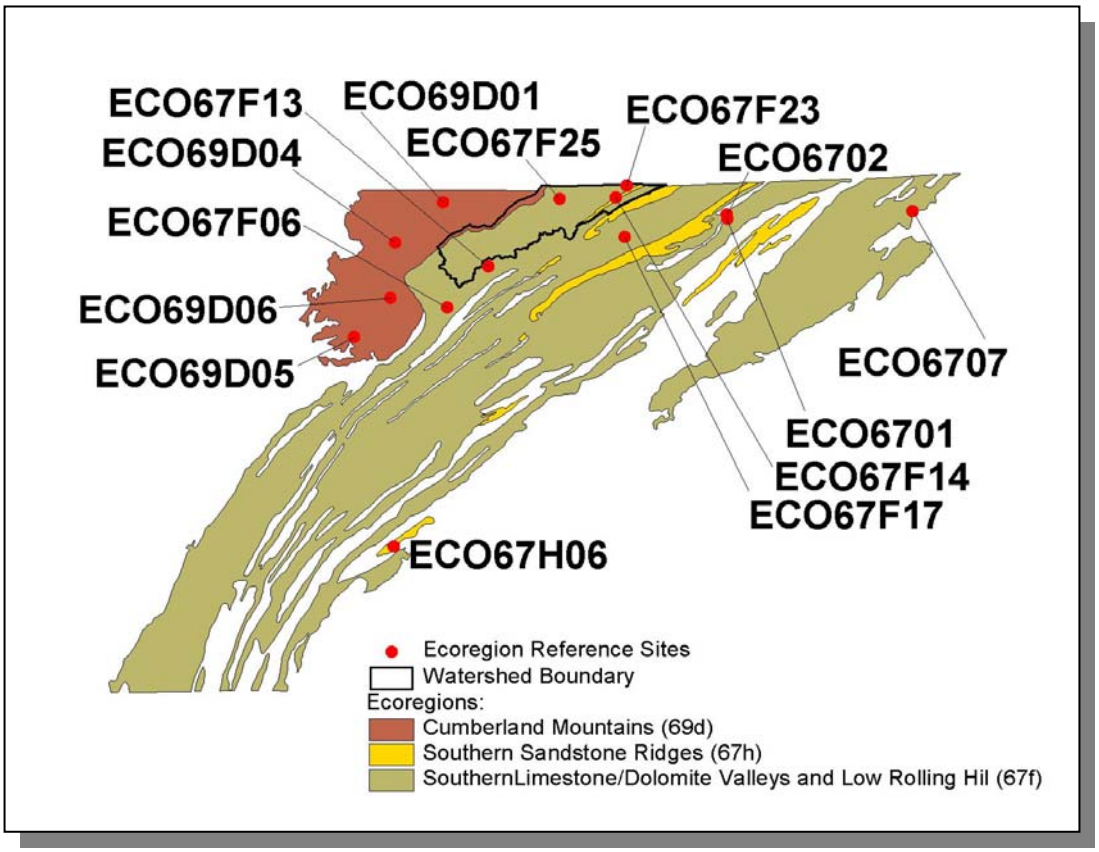

Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 69d, 67f, and 67h. *The Tennessee portion of the Powell River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Designated State Natural Area. The Natural Areas Program was established in 1971 with the passage of the Natural Areas Preservation Act. TDEC/Division of Natural Heritage administers the State Natural Areas program. Further information may be found at http://www.state.tn.us/environment/nh/natareas/

The Tennessee portion of the Powell River Watershed has one Designated State Natural Area:

> **Powell River Preserve Class II Natural-Scientific State Natural Area** is a 29-acre natural area located in Claiborne County bordering the Powell River. This small preserve occurs on moist calcareous slopes where wet seeps support large populations of state-listed species.

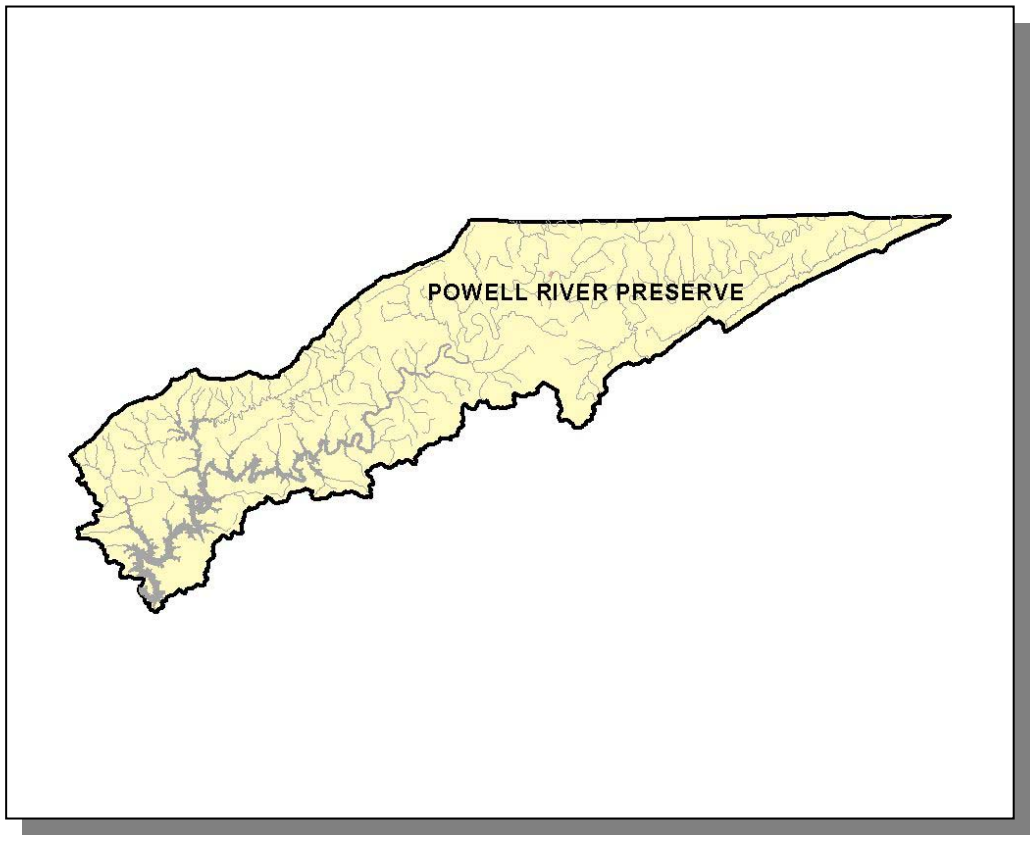

Figure 2-12. There is One Designated State Natural Area in the Tennessee Portion of the Powell River Watershed.

2.6.B. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	1
Insects	5
Mussels	18
Snails	1
Other	1
Amphibians	3
Birds	3
Fish	6
Mammals	10
Plants	26
Total	**74**

Table 2-3. There are 74 Known Rare Plant and Animal Species in the Tennessee Portion of the Powell River Watershed.

In the Tennessee portion of the Powell River Watershed, there are six known rare fish species, eighteen known rare mussel species, one known rare snail species, and one known rare crustacean species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Ammocrypta clara	Western sand darter		T
Cypronella monacha	Spotfin chub	LT	T
Erimystax cahni	Slender chub	LT	T
Noturus flavipinnis	Yellowfin madtom		E
Percina aurantiaca	Tangerine darter		D
Percina macrocephala	Longhead darter		T
Conradilla caelata	Birdwing pearlymussel	LE	E
Dromus dromas	Dromedary pearlymussel	LE	E
Epioblasma brevidens	Cumberlandian combshell	LE	E
Epioblasma capsaeformis	Oyster mussel	LE	E
Epioblasma triquetra	Snuffbox		
Fusconaia cuneolus	Fine-rayed pigtoe	LE	E
Fusconaia edgariana	Shiny pigtoe	LE	E
Hemistena lata	Cracking pearlymussel	LE	E
Lexingtonia dolabelloides	Slabside pearlymussel	C	
Plethobasus cicatricosus	White wartyback	LE	E
Plethobasus cooperianus	Orange-foot pimpleback	LE	E
Plethobasus cyphyus	Sheepnose		
Pleurobema oviforme	Tennessee clubshell		
Ptychobranchus subternatum	Fluted kidneyshell	C	
Quadrula cylindrical strigillata	Rough rabbitsfoot Pearlymussel	LE	E
Quadrula intermedia	Cumberland monkeyface	LE	E
Quadrula sparsa	Appalachian monkeyface	LE	E
Triodopsis claibornensis	Claiborne three-tooth		
Io fluvialis	Spiny riversnail		
Stygobromus finleyi	Finley's cave amphipod		

Table 2-4. Rare Aquatic Species in the Collins River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service; LT, Listed Threatened by the U.S. Fish and Wildlife Service; C, Candidate species for listing by the U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; T, Listed Threatened by the Tennessee Wildlife Resources Agency D; Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

2.7. CULTURAL RESOURCES.

2.7.A. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of one stream in the Tennessee portion of the Powell River Watershed:

> Powell River (RM 47 to RM 105) is a slow, winding river in a sparsely populated corridor with wooded banks and a highly diverse mussel fauna.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Powell River	X	X	X	X	X	X	X

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at http://www.ncrc.nps.gov/rtca/nri/

2.7.B. Public Lands. Some sites representative of the cultural heritage are under state or federal protection:

- Cumberland Gap National Park, located where the borders of Tennessee, Kentucky, and Virginia meet, was established in 1940. More information may be found at http://www.nps.gov/cuga/.
- Chuck Swan Wildlife Management Area is a 24,444-acre area managed by TWRA in Campbell and Union Counties.
- Rainbow Richlands Resort is a 384-acre resort in Campbell County.
- Stiner Woods Small Wild Area is located in Union County, and is maintained by TVA.

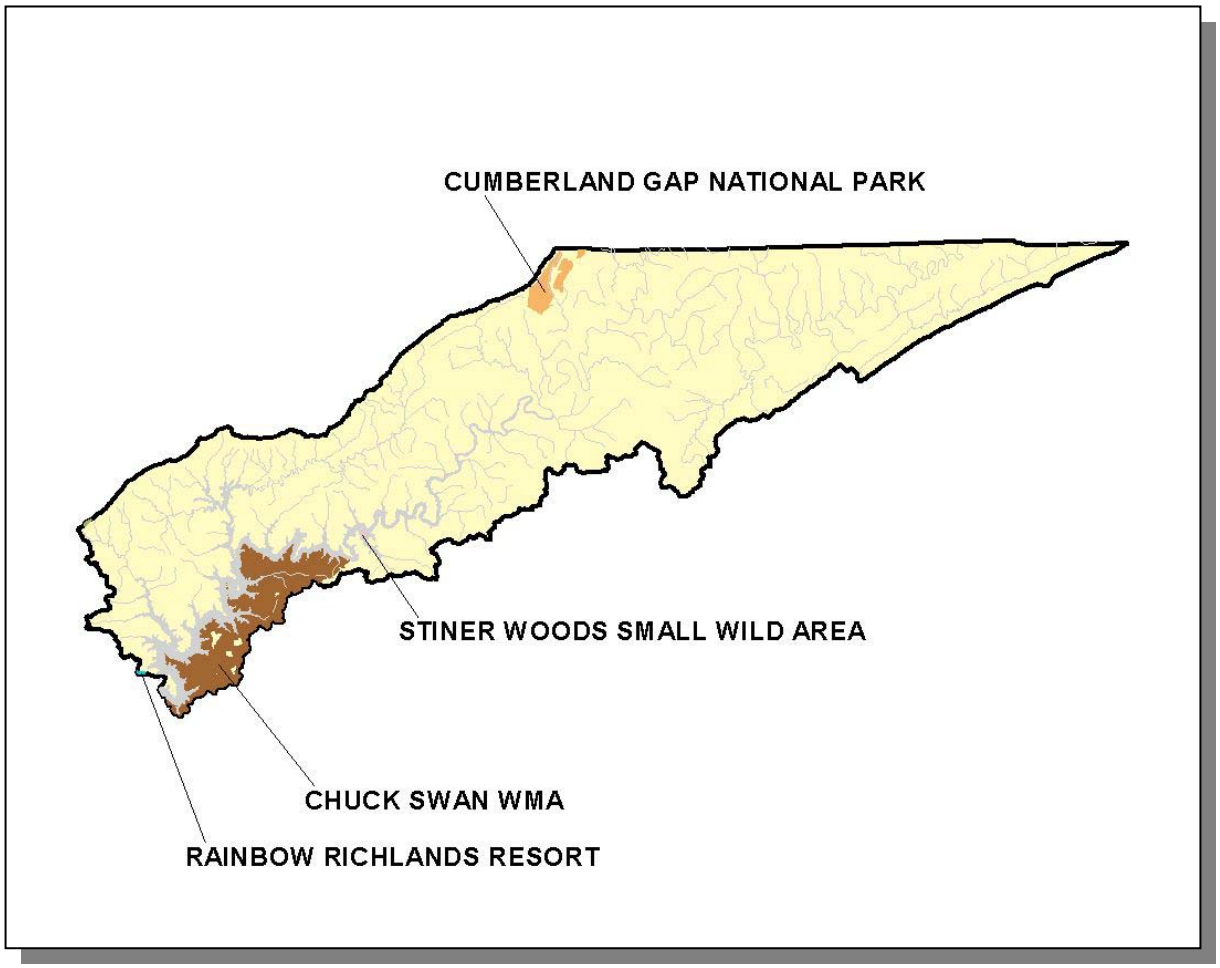

Figure 2-13. Public Lands in the Tennessee Portion of the Powell River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Davis Creek	3			Martin Creek			
Dossett Creek				Mulberry Creek	3		
Gap Creek	2		2	Old Town Creek	2		
Indian Creek	1		2	Powell River	1	2	2
Leadmine Bend creek				Russell Creek	2		

Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed